Abstract Submitted
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Measurements of Reacting Fuel Sprays Using High-Speed Imaging[1] JACKLYN HIGGS, JOSHUA BITTLE, The University of Alabama — Engineers are currently looking for solutions to reduce waste and the effects transportation needs have on the environment. One method is to transition to biofuels in diesel engines. Computational Fluid Dynamics (CFD) simulations can be useful provided enough experimental data is available for validation. Hence, we need real experiments to determine the relationship between simple properties of fuels that we can measure and the results of actual combustion experiments. An optically accessible constant pressure flow rig (CPFR) is the primary experimental apparatus and it can be used to set control parameters to study the fuel-air mixing in conditions similar to diesel engines. A schlieren camera measures initial fuel-air mixing, a chemiluminescence camera measures initial combustion, and a two color pyrometry camera measures soot production. Extensive test campaigns at various injection conditions, ambient conditions, and fuel type will enable a new level of understanding of the diesel combustion process. Before significant testing can be completed, the primary focus of the work presented here is on efforts to optimize the experimental set-up by addressing some key experimental challenges that had previously limited the quality of data obtained. Significant effort was also dedicated to developing code to aid in processing a limited initial data set. This code serves as a proof of concept that can be leveraged for larger data sets to be acquired in the future. As a result, the lab is an efficient and effective work space that allows for ease with acquiring data.

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